

a trench insulating layer that lines a bottom and sidewalls of said trench and prevents direct electrical contact between the trench-based electrode portion of said base electrode and said extrinsic base region; and

an emitter region of first conductivity type that forms a P-N rectifying junction with said intrinsic base region.

Please cancel Claims 2-4.

5. (Amended) The transistor of Claim 1, wherein said emitter region is self-aligned to a sidewall of the lateral base electrode extension.

6. (Amended) The transistor of Claim 1, wherein said trench is ring-shaped; and wherein said extrinsic base region is ring-shaped.

7. (Amended) The transistor of Claim 5, further comprising:

an electrically insulating sidewall spacer on the sidewall of the lateral base electrode extension; and

an emitter electrode of first conductivity type on the surface of said substrate and on said electrically insulating sidewall spacer.

27. (Amended) A bipolar junction transistor, comprising:

an electrically insulating layer on a surface of a semiconductor substrate having an intrinsic collector region of first conductivity type therein, said electrically insulating layer comprising a composite of a first electrically insulating material layer and a second electrically insulating material layer on the first electrically insulating material layer and having a lateral recess therein that extends along an undersurface of the second electrically insulating material layer;

a trench that extends into the surface of the semiconductor substrate and into the intrinsic collector region and is self-aligned to an opening in said electrically insulating layer;

a base electrode of second conductivity type having a first portion that extends in said trench and a second portion that extends into the lateral recess within said electrically insulating layer;

a base region of second conductivity type that is self-aligned and electrically connected to the second portion of said base electrode extending into the lateral recess and forms a P-N rectifying junction with said intrinsic collector region;

a trench insulating layer that lines a bottom and sidewalls of said trench and extends between the first portion of said base electrode and said base region so that a direct electrical connection between the first portion of said base electrode and said base region is blocked; and

an emitter region of first conductivity type that forms a P-N rectifying junction with said base region.

28. (Twice Amended) A bipolar junction transistor, comprising:

a semiconductor substrate having an intrinsic collector region of first conductivity type therein that extends to a surface thereof;

an electrically insulating layer on the surface of a semiconductor substrate, said electrically insulating layer having an opening therein and a lateral recess extending from the opening;

a trench that extends into the surface semiconductor substrate and the intrinsic collector region and is self-aligned to the opening in said electrically insulating layer;

a polysilicon base electrode of second conductivity type in the lateral recess and in the trench;

an extrinsic base region of second conductivity type that extends into and forms a P-N junction with the intrinsic collector region and is self-aligned to a portion of the polysilicon base electrode that extends into the lateral recess;

an intrinsic base region of second conductivity type that forms a non-rectifying junction with said extrinsic base region and a P-N rectifying junction with the intrinsic collector region, said intrinsic base region having a lower doping concentration therein relative to said extrinsic base region; and

an emitter region of first conductivity type that extends in the intrinsic collector region.